

ELEMENTS OF SUCCESSFUL STORMWATER OUTREACH AND EDUCATION

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Abstract

Population growth, residential and industrial development, and the resulting increase in impervious surfaces have led to stormwater quality and quantity concerns and related habitat and fiscal issues. To effectively manage such issues, stormwater professionals are finding it necessary to develop community support through implementation of education strategies. This need arises not only from the regulatory requirements of EPA Phase II Stormwater rules, but also from the recognition that local decision makers, citizens and elected officials will require more than a rudimentary grasp of stormwater pollution concerns in order to make effective decisions that will have a positive impact on stormwater issues.

Throughout EPA Region 5, the University Cooperative Extension System is playing a strong role in developing effective, outcomes-based stormwater education and outreach programs that not only meet the federal requirements, but also the needs of the communities they serve. This paper will highlight some of the successful stormwater education and outreach programs that Cooperative Extension is involved in and describe its role in building the capacity of decision-makers. Elements of successful stormwater education programs will also be highlighted.

Situation Statement

Like many regions in the country, states in the Midwest are experiencing some areas with rapidly growing populations and accompanying development pressures. Population growth has spurred industrial, commercial and residential development not only around the major metropolitan areas, but also in the surrounding agricultural landscapes as well. For example, Ohio, which ranks as the 5th most populated state nationally, is experiencing land development rates (in acres) 4.7 times faster than its population increase (Lawrence, 2002). The resulting increase in impervious surface has led to stormwater quality and quantity concerns and related habitat and fiscal issues.

To effectively manage such issues, stormwater professionals are finding it necessary to develop community support through implementation of education strategies. The need to develop a knowledge base arises not only from the regulatory requirements in EPA Phase II Stormwater Rules, but also from the recognition that elected and appointed officials may have little incentive to prevent stormwater problems from escalating unless they have a rudimentary understanding of stormwater concerns and solutions.

Two critical elements of Stormwater Management plans are the development and implementation of an educational plan and public participation.

In the 6 states in EPA Region 5 (Minnesota, Wisconsin, Illinois, Indiana, Michigan and Ohio), over 1,800 communities are required by the Phase II Stormwater Rule to obtain a stormwater permit and develop a stormwater management plan (Federal Register, 1999). Developing educational and public participation strategies for all of these communities requires creative partnerships to not only meet the stormwater requirements, but more importantly to ensure that stormwater programs are effective in reducing pollution and improving water quality. The U.S. Environmental Protection Agency (EPA) has identified the importance of informing and educating municipalities, the construction trades, professional service providers, and citizens about storm water pollution. Control of stormwater pollution is most effectively implemented when people and organizations understand the impact of stormwater pollution, its sources, and the actions they can take to control it (Dane County, 2003).

University Extension Systems in many of the Midwestern states are involved in and taking a lead role in developing education programs to address stormwater and urban water quality issues. These programs are conducted at several scales including regional, statewide, local or watershed, and metropolitan area. These programs encompass several key elements for successful educational programming. Programs from three states, and successful educational program elements, will be highlighted below.

Highlighted State Programs

Ohio

Ohio's statewide program goes well beyond efforts required by stormwater regulations and finds its foundations in long-term watershed work that has occurred over the past decades in the state. Ohio's statewide Nonpoint Source Education for Municipal Officials (NEMO) program encompasses a broad partnership of agencies, with educational efforts led by the Ohio State University Extension (OSUE). The Ohio NEMO program attacks a broad range of land use related water issues including stormwater, source water and general natural resources based land use planning. Modeled after the National NEMO program, the Ohio version is a non-regulatory research based educational program that addresses NPS pollution and its link to different land uses, particularly impervious surfaces and, transport and concentration of pollutants in stormwater. The Ohio NEMO program is a multi-level education program that involves 5 OSU Extension Watershed Agents and several partner agencies for statewide delivery of educational programs that meet the needs of agency staff, watershed groups, and local officials who are facing rapid urban expansion into traditional agricultural areas.

The NEMO program also works to continue delivery of education as the constant turnover of local township trustees, county commissioners and zoning board officials highlight the need to keep these decision makers aware of the ramifications of land use impacts on water quality. The goals of the program, which expand beyond stormwater education needs, are to increase public participation in water resources decision making processes, and increase collaborative efforts of citizens and local decision makers in both development and implementation of watershed action plans and source water protection plans.

OSUE faculty have several roles in the NEMO program. In addition to providing overall coordination and leadership, OSUE augments local education efforts with materials, slide shows and more importantly, educators that have knowledge expertise in stormwater and natural resources planning as well as skills in facilitation and teaching strategies.

Successful elements of the NEMO program which lend themselves to effective outreach and education programs include the systematic approach to address the turnover of local decision makers and the

interconnection of stormwater with other natural resources planning efforts. For example, since the beginning of the program, 80 professional staff have participated in training sessions on the use of NEMO materials with local officials and watershed groups. These staff are then available to provide ongoing training to new decision makers when turnover occurs (Lawrence, 2002).

Wisconsin

University of Wisconsin Extension (UWEX) faculty are involved in several stormwater education initiatives throughout the state. In Dane County, 19 communities came together to develop a joint Information and Education Plan and hire a half time education specialist to implement the plan. UWEX faculty provided information to communities on why education is important and how to develop an education plan. This work built community support and led to the development of an agreement to set aside funding to support development of a Plan, hire the stormwater educator and provide \$10,000 of annual funding for program implementation. UWEX also facilitated the process of developing the Information and Education Plan with a committee of representatives from the 19 communities and Department of Natural Resources. The stakeholder committee first developed educational goals and UWEX was able to bring their expertise in proven outcomes-based educational strategies to bear on these goals. This included identifying and ranking target audiences and subsequently prioritizing educational objectives for each of the specific audiences. UWEX also played a significant role in writing the final Plan document.

Successful elements of this approach include the identification of what the educational program efforts are to achieve (i.e. the goals) and the target audience. This approach prevents the scatter-shot effect of random educational efforts that are difficult to prove whether they have had an impact or not. Another successful element of this effort includes a significant evaluation component funded by a separate grant. A pre-assessment survey will be delivered to 500 residents in the communities to assess perceptions, behavior and willingness to change behavior. After five years, a post-assessment survey will be administered to evaluate the effectiveness of the stormwater program. Additionally, each major educational programming effort will be evaluated to ensure that it is having the desired affect on changing people's behavior (Wade, 2002).

A related effort in Dane County was the development of a public participation process for their stormwater ordinances. The UWEX role included working with specialists and engineers to develop the ordinance, then providing outreach to local government units about the ordinance, and providing technical workshops for engineers and consulting firms. A key UWEX role was to involve a wide variety of stakeholders early in the ordinance development process and ensure their time and skills were well utilized. They enabled the ordinance information to be re-packaged for the various audiences they were targeting. They also encouraged public participation prior to ordinance development so that concerns were brought out early in the process (Habecker, 2002).

A third educational initiative in Wisconsin occurred in the Fox Valley in the northeast region of the state. This more traditional educational initiative included regional stormwater conferences and workshops on a variety of regulatory and technical stormwater topics; a county-based stormwater management plan development process; and a high school youth based stormwater monitoring project. UWEX faculty and staff play key leadership roles in developing and implementing these programs. These three nested initiatives focused on targeting the various audiences, while linking education with technical expertise to ensure audiences were able to understand the complex nature of stormwater management alternatives to make the best decisions (Koles and Neiswender, 2002).

Minnesota

The University of Minnesota Extension (UMNEX) is extensively involved in the Metro Water Quality Education Program in the Twin Cities (St. Paul and Minneapolis) metro area. This program, which is a partnership of several agencies, targets educational programs to citizens, industry and local decision makers. Several deliverable programs focus on lawn care, volunteer stream monitoring, wetland evaluation, NEMO and Phase II Stormwater Education. Since Metro area water quality education involves a host of other organizations, departments and agencies, the UMNEX plays a lead role in coordinating educational efforts of these entities to create both efficient and effective educational programs. UMNEX also helps the groups enhance their efforts by pooling financial and institutional resources leading to less expensive educational programming, more consistent information and greater educational impacts.

A new initiative in the Metro area will focus on lawn, garden and home practices that improve urban stormwater quality. This new educational program will target homeowners and public property managers and have an accompanying evaluation plan that will evaluate short and medium-term outcomes of the educational initiatives (Struss, 2002).

Role of Cooperative Extension

This sampling of education initiatives throughout the Great Lakes region emphasizes the value of a proactive approach to building education into the development of stormwater management programs. The University Extension System has played key lead roles in these examples, which are ultimately all highly collaborative with other partners. These programs elevate the importance of education to the same level of importance as the engineering, modeling and monitoring work that must also go into development of a stormwater plan. Many of our clean water goals will only be met through the individual actions of citizens, construction crews, and local decision makers – actions that require targeted educational programs to change these behaviors.

University Extension faculty have the education and process skills that lend themselves well to stormwater programs. In these examples Extension faculty have acted as educators for a variety of audiences including local government decision makers; facilitators of meetings and processes that lead to the development of educational strategies and sound decisions; specialists in outcomes-based educational program development; authors of educational plans; and conveners of broad collaborative groups during various stages of stormwater plan development.

Successful Education Elements

There is some feeling that regulation and enforcement should be the main tools to accomplish clean water goals, instead of education. However, past programs that relied solely on enforcement or monetary incentives have not been successful. Research in Milwaukee, Wisconsin showed that a strong education program must complement other means - especially when enforcement is spotty, penalties are light and the audience is vast and widespread. Education programs can often be under funded or eliminated as an element of a comprehensive stormwater management program. Therefore it is critical that anytime an education program is developed, it must be effective and justify the resources and time used to implement the program (Dane County, 2003).

Several elements of success are presented here to help communities, educators and program managers build effective education programs. These elements are drawn from several stormwater and urban water quality education programs throughout the upper Midwest that have leadership by or involvement of the University

of Extension System in the state. The definition of success will vary from program to program, but generally speaking, a successful education program is one that targets its audience and achieves the desired outcomes and behavior changes. Likewise, success also includes elements of efficiency and sustainability.

These elements are:

- ❖ Going beyond ‘awareness’ – using outcomes-based educational principles
- ❖ Audience targeting – particularly decision-makers
- ❖ Partnering educators with technical expertise
- ❖ Incorporating stormwater into other natural resources and land use planning efforts
- ❖ Using public participation effectively
- ❖ Coordination of multi-jurisdictional efforts to effectively use education dollars
- ❖ Evaluation strategies

Outcomes-Based Education

A large body of research describes education principles, communication science and current learning theory and their application to environmental and community-based projects (see for example Rice and Atkin, 2001; Rogers, 1995). Addressing complex environmental issues, such as stormwater management, requires a combination of technical programs, best management practices and a vigorous and targeted education strategy. Without effective education programs, best management implementation is often only done by the early adopters. Effective education programs are ones that apply the outcomes-based principles of situation analysis, audience targeting, and a focus on the desired behavior changes, not the ‘products’ of a typical outreach or public relations program. Social marketing theory and research points to flaws in traditional single-media educational campaigns and their inability to target key audiences (Earle, 2000; Shepard, 1999; Hill, 1996). However, this research has not been incorporated enough into development of outreach programs for environmental programs. For this reason, these outreach programs become little more than public relations efforts relying too much on mass media, and as a consequence too often fail to achieve meaningful behavior changes.

The University Extension System has long practiced outcome-based education in its programming efforts (Seevers, et al. 1997). These methods rely on developing locally driven programs with the audience in mind, integrating research and knowledge to improve understanding and decision making, and focusing on desired outcomes (Scarborough et al., 1997; Van den Ban and Hawkins, 1996). These principles are regularly applied to a wide array of Extension programming and can be successfully applied to stormwater programs as well. See Figure 1 for a diagram of Program Development and Evaluation method that is based on outcomes-based education principles.

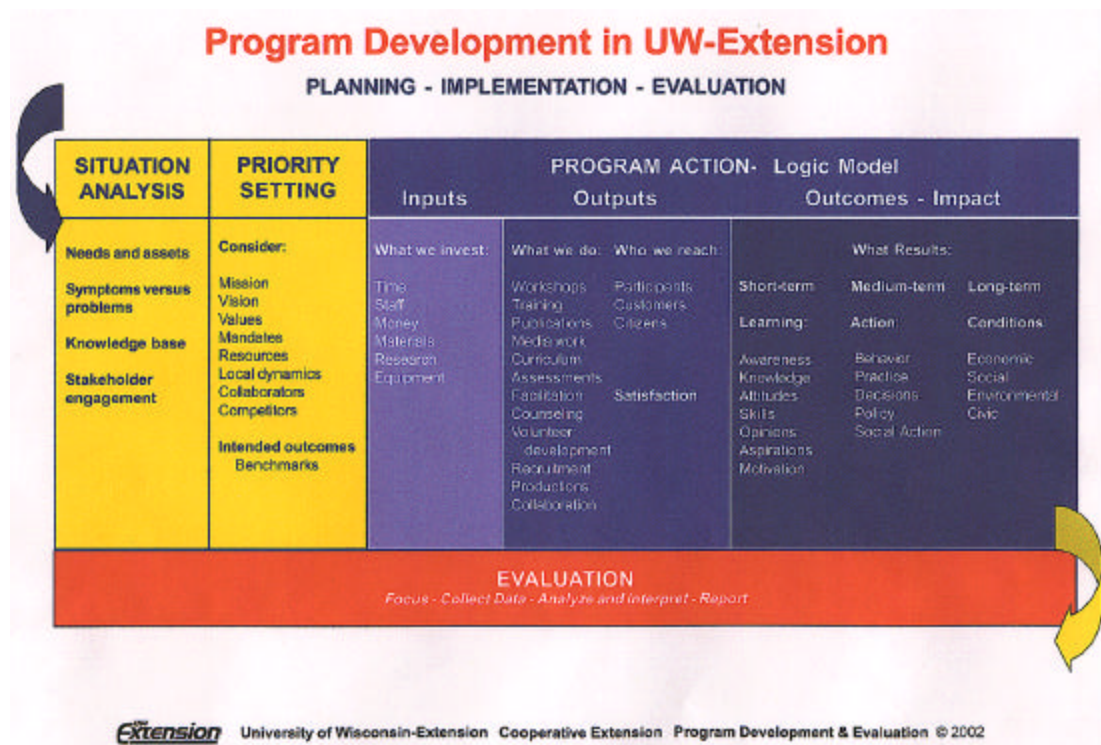


Figure 1. UW-Extension Program Development Model

Using outcomes-based education principles means focusing on desired outcomes of your educational program (i.e., behavior change), not just the immediate outputs (i.e., factsheets, workshops and billboards). Programs must go beyond making people aware of the problem and rather should focus on changing critical behaviors. Though glossy publications are attractive, do they really lead to the behavior changes needed to meet the water quality goals of the stormwater plan? Outcomes based education uses several social marketing concepts to be successful, including 1) asking for a commitment from the audience, 2) placing specific behavior prompts near behavior, 3) communicating the norm, and 4) removing barriers to desired behavior (Dane County, 2003). An example of outcomes-based education is illustrated by Ohio's NEMO program. A desired outcome of the educational initiative was the adoption of stormwater principles into regulations and policies – an important behavior change by local officials that ultimately leads toward the improvement of environmental quality. The program highlights several communities that adopted stormwater management principles, due in part as a result of the Ohio NEMO educational programming they participated in.

In Wisconsin, 19 communities in and around Dane County formed a committee to develop a joint Information and Education Plan for their stormwater permit application. Specific behaviors that would affect water quality change were identified and prioritized based on their potential impact to change water quality. For example, controlling construction erosion in this rapidly developing area was identified as a key issue; desired behavior changes included implementing specific Best Management Practices. The 19 communities deliberately worked to develop and prioritize strategies that will focus on these outcomes.

Also in Wisconsin, in the rapidly developing Fox Valley a county and regional education strategy was developed. It focused on the desired behavior change of local decision makers to develop policy and effectively apply tools and technologies to their stormwater programs. Positive outcomes of this

educational strategy included the adoption of new stormwater and construction site erosion control ordinances and commitment of a county revolving loan fund to support better stormwater management.

Audience Targeting

Targeting the audience is critical to effective education programs. Focusing on desired behavior change requires the educator to focus on a specific collection of people that will do that behavior change. In Wisconsin, a joint Information and Education plan identifies three types of audiences for their efforts, 1) those that must act (elected officials, homeowners, business owners, developers), 2) those that must support change (conservation groups, civic organizations, media and concerned citizens) and 3) those who are future supporters and actors (youth, teachers) (Dane County, 2003). In Ohio, their NEMO program targets decision makers and recognizes in particular that local officials and decision makers have high turnover rates and a process must be in place to educate new decision makers as change of leadership occurs. A cadre of professional staff have been trained to provide continuous support as this audience turns over periodically.

Partnering Education with Technical Expertise

It is critical to engage the technical expertise of consultants and engineers when developing and implementing stormwater education programs. For many aspects of stormwater management, the devil is in the details, and the stormwater professional is the most appropriate person to help address technical questions and provide analysis of options. During the county Stormwater Technical Advisory Committee process in WI, the technical engineers regularly paired up with the Extension educator to present detailed concepts and alternatives to their audience. The best role of the educator is to work with the technical experts to communicate the technical messages to a variety of audiences in understandable ways (Koles and Neiswender 2002).

Incorporating Stormwater into Natural Resources planning processes

Stormwater management fits logically into other natural resources and land use planning efforts. Often the same measures taken to protect natural resources and manage sprawl (such as conservation design, and reducing impervious surfaces) serve the dual purpose to protect stormwater infiltration areas like wetlands and vegetated areas, foster on-site treatment and infiltration and reduce runoff via traditional curb and gutter designs. Multi-agency coordination will strengthen the ability of planners to integrate various natural resources and land-use planning elements together.

The Ohio NEMO program highlights the interconnections between stormwater and natural resources management planning and works with local government officials to build their capacity to integrate these programs.

Public Participation

Public participation is one of the 6 minimum measures of a stormwater plan and when done correctly, can build the support needed to fund and implement changes that will affect nearly everyone in the community. In Dane County, WI a public participation plan was developed prior to the development of the stormwater ordinance. The public was engaged to help design the ordinance by providing the parameters and guidelines. A team of specialists then developed the technical specifications to meet these criteria. The use of public participation prior to ordinance development enabled the county to minimize potential conflict resulting from ordinance changes.

Coordination of multi-jurisdictional and multi-agency efforts

Efficiencies can be gained by coordinating educational efforts and messages and pooling educational dollars. Several examples exist. In Minnesota, the Metro area of Minneapolis-St. Paul recognizes that county tax dollars and university resources are most effectively used when there is coordination among the host of organizations that have an educational role or need. In Wisconsin, the 19 municipalities in Dane County all pooled their local resources to fund a joint stormwater educator position that would serve all of the communities. Additionally, Ohio's Stormwater Task Force, comprised of several local and state agencies, consultants and environmental groups, guides implementation of Phase II in Ohio and coordinates educational activities across agencies.

Evaluation

To know that scarce education dollars are spent well and desired behaviors are changed, it is important to evaluate educational programs. Evaluation measures a variety of outcome data against the program's intent (Bennett and Rockwell, 1995). Evaluation should occur for short, medium and long-term desired outcomes to ensure the educational program is on track.

The Metro Educational program in Minnesota and the Dane County Joint Education Plan in Wisconsin are excellent examples of educational initiatives that have built in an evaluation plan at the beginning of the effort. In Dane County a scientifically designed pre-assessment survey will be delivered to 500 residents in the communities to assess perceptions, behavior and willingness to change behavior. After five years, a post-assessment survey will be administered to evaluate the effectiveness of the stormwater program.

Conclusion

The success of these education approaches does not mean the stormwater learning needs will subside. On the contrary, enhanced regulatory measures, continued growth, and related environmental factors are effectively increasing the demand for quality outreach education. The expectation that individual and collective behavior changes will improve stormwater quantity control and quality necessitates continuous, multi-tiered, education strategies.

The authors encourage stormwater professionals and educators to use outcomes-based educational principles when developing their education strategies. Additionally, professional facilitation and process skills are critical to development of educational plans and public participation initiatives required by the new stormwater rules. The University Extension System has expertise in these areas and in many places is working with or taking the lead on stormwater educational programming and collaboration.

Such programs are critical to achieving desired results and behavior changes that will have a positive impact on stormwater quality and quantity. The authors challenge states and communities to consider stormwater educational programming a valid and serious part of their overall stormwater management plan and design strategies that are targeted to local situations.

For more information

For more information on the programs described above contact the author at catherine.neiswender@ces.uwex.edu. The Ohio NEMO program is found on the web at <http://nemo.osu.edu>. A listing of University Extension Water Quality contacts is available at <http://www.usawaterquality.org/contacts/WQCDirectory.pdf>.

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